Take Heart: Results from the Initial Phase of a Work-SiteWellness Program

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ABSTRACT

Objectives. The purpose of this study was to evaluate the short-term effects of a low-intensity work-site heart disease risk reduction program using a matched pair design with work site as the unit of analysis.

Methods. Twenty-six heterogeneous work sites with between 125 and 750 employees were matched on key organization characteristics and then randomly assigned to early or delayed intervention conditions. Early intervention consisted of an 18-month multifaceted program that featured an employee steering committee and a menu approach to conducting key intervention activities tailored to each site.

Results. Cross-sectional and cohort analyses produced consistent results. At the conclusion of the intervention, early and delayed intervention conditions did not differ on changes in smoking rates, dietary intake, or cholesterol levels. There was considerable variability in outcomes among work sites within each condition.

Conclusions. Despite documented implementation of key intervention activities and organization-level changes in terms of perceived support for health promotion, this intervention did not produce short-term improvements beyond secular trends observed in control work sites. Research is needed to understand determinants of variability between work sites. (*Am J Public Health.* 1995;85:209–216)

Introduction

Despite significant declines, coronary heart disease remains the single largest cause of mortality in the United States. There is widespread agreement that elevated cholesterol, smoking, and high blood pressure play a causal role in coronary heart disease and that reducing these risk factors in populations will lower the incidence of heart ailments, with important economic implications for the business community.[1–3] What remains to be determined is how to effect changes in risk factors in large populations in a practical way and at an affordable cost.[4,5]

In many respects, work sites are opportune settings for delivering risk factor intervention programs.[6,7] They provide opportunities for repeated access to a large segment of the employed population. Health promotion resources available in work sites include various means for educating employees, natural support groups, and the opportunity to support change through health-related policies at the organizational level.

Pelletier[2] concluded that a growing number of studies provide evidence that work-site health promotion interventions can be effective. Although encouraging, many of these studies suffer from significant methodological and practical weaknesses.[6–8] For example, most interventions have been tested by evaluating only employees who self-select to participate in programs, and, unfortunately, participation rates are often low.[8] Only rarely is the effect of the intervention assessed in terms of change among all employees.[3,9,10] Another problem is that studies comparing treatment and control work sites often include only two or, at most, a few sites.[11] Even when sites are randomly assigned to condition (which is often not the case), evaluation designs typically do not permit use of the work site, as opposed to employees, as the unit of analysis. Using employees as the unit of analysis ignores potential intraclass or intrasite correlations and usually overestimates the statistical significance of the intervention effect. A third limitation of many work-site studies is reliance on intensive, highly structured, and expensive interventions delivered by highly trained research staff,[12,13] a model difficult to replicate. A fourth problem is the difficulty in differentiating intervention effects from other variables such as secular trends, contextual factors including state or local health policy changes (e.g., excise taxes, clean indoor air acts), and medical insurance.[14–16] A final issue is that most work-site interventions are relatively short term (e.g., less than 1 year) and do not address the challenge of how to support long-term maintenance of employee behavior change.

The project described here—Take Heart—attempts to address many of these practical and methodological issues. Our goal was to stimulate risk factor change among entire populations of employees in a large number of work sites through the use of relatively low-cost

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Editor's Note. See related editorial by Susser (p 156) in this issue.

TABLE 1—Organizational Characteristics at Baseline

	Early Intervention Sites (n = 12)	Delayed Intervention Sites (n = 12)	P
Company type and union status, no.			
Private	6	8	NS
Public	7	5	NS
Manufacturing or sales	5	6	NS
Government	6	5	NS
Unionized	10	7	NS
Workforce			
No. of employees, mean (SD)	263 (114)	249 (150)	NS
Female employees, % (SD)	30 (20)	38 (24)	NS
Non-White employees, % (SD)	4 (2)	8 (4)	<.05
Employee classification, % (SD)			
Managerial/professional	24 (27)	23 (16)	NS
Technical, sales, clerical	23 (19)	31 (19)	NS
Craft, skilled, semiskilled	28 (27)	35 (26)	NS
Unskilled or service	25 (24)	11 (21)	NS
Health-related activities, no. (%)			
Wellness committee	4 (33)	6 (50)	NS
Written smoking policy	10 (83)	9 (75)	NS
Stop smoking program	7 (58)	7 (58)	NS
Cholesterol screenings	8 (67)	9 (75)	NS
Baseline health promotion activities,[a] proportion (SD)			
Diet	.24 (.21)	.26 (.18)	NS
Tobacco use	.32 (.20)	.29 (.15)	NS

[a]Number of activities conducted/number of possible activities in that area.

organizational, activity, and policy interventions. Interventions were adapted and implemented, in large part, by employee steering committees at each work site[17-19] so as to minimize intervention costs and promote ownership, participation, and long-term maintenance.

We have shown elsewhere (R. E. Glasgow and J. R. Terborg, unpublished data, 1994) that such steering committees can bring about significant changes in organizational health promotion practices relative to comparison sites, even in this era of rapidly expanding health promotion efforts.[20] We report here on work-site-level changes in smoking prevalence, dietary fat intake, and serum cholesterol among employees in randomly assigned treatment and measurement-only work sites.

Methods

Research Design

The Take Heart project is a randomized trial comparing 13 early intervention work sites and 13 matched delayed intervention work sites. Work sites that had between 125 and 750 employees and were located within 96 km (60 miles) of Eugene, Ore, were recruited to participate. Forty-two work sites were contacted, and 27 originally agreed to participate. One work site subsequently withdrew after takeover by another company.

After baseline assessment (1991), 26 work sites were matched on (1) type of industry (manufacturing/sales vs all other), (2) number of employees (125 through 150, 151 through 250, or 251 through 750), and (3) a composite variable that reflected level of employee participation in baseline assessments and the extent to which companies had previously offered health promotion activities. The resulting matched pairs were then randomly assigned to either early or delayed intervention conditions.

Work sites ranged in size from 100 to 628 employees, with an average of 247. After baseline assessment, one organization was dropped after it was acquired by another company and reduced its employees to fewer than 25. Fourteen work sites were privately held companies, and 12 were from the public sector. Seventeen were unionized. As can be seen in Table 1, early and delayed intervention conditions were well matched on work-site and employee characteristics.

Assessment Procedures

Work sites were assessed in spring 1991 on the organizational and employee behaviors described below. Employees were provided paid release time from work to attend screenings. Assessments took place at the work site at convenient locations and times. Employees were assessed in groups of 20 or fewer, and baseline assessment took between 20 and 60 minutes. Measures included an employee health habits and job characteristics survey, a finger-stick cholesterol assessment, and the Block diet history questionnaire.[21] These same assessments were repeated in spring 1993, except that the dietary assessment was changed to use a "fat screening" instrument[22] that was a subset of the full Block questionnaire and took considerably less time.

The assessments of employees were voluntary, and participation rates varied from 26% to 83% (mean = 48% in 1991) across work sites. A total of 2791 employees participated in the 1991 assessments; mean participation rates were 38% and 58% for early and delayed intervention work sites, respectively. In 1993, 2622 employees took part; estimated participation rates were 40% (early intervention) and 57% (delayed intervention). Subjects provided a unique code by giving their date of birth, first three letters of their mother's maiden name, and first letter of their first name. This code allowed a match between 1991 and 1993 assessments that resulted in a cohort of 1222 employees (47% of the baseline participants) for longitudinal, cohort evaluations of intervention effects. As a result of confidentiality agreements with the work sites, we do not have information on how many baseline participants were still employed at the work site at the time of follow-up or on the characteristics of nonrespondents. Work-site contacts generally believed that the characteristics of resulting samples were representative.

Dependent Measures

Organizational data. Objective data on the work site were obtained by interviewing a key informant, usually the human resources manager. Each year a human resource practices questionnaire assessed characteristics of the work force such as percentage of women, employees in different job categories, turnover rate, and whether the work site had conducted each of a list of 37 health promotion activities.

Program implementation/process data in early intervention work sites were recorded by project staff in two ways.

Intervention activities selected by steering committees and attendance at committee meetings were coded on a steering committee report form after each meeting. An activity report was completed to record employee participation and length and type of event for each Take Heart activity conducted.

Employee measures. Employee assessments consisted of an employee health habits and job characteristics survey, a finger-stick cholesterol assessment, and a diet history questionnaire. The survey included items on perceived support from supervisors and coworkers for tobacco- and dietary-related behavior change, stage of change in these areas, attempts to quit smoking or reduce fat intake over the previous year, and current tobacco use. Smoking status was assessed by the question "Have you smoked a cigarette, even a puff, during the past 7 days?" The employee survey concluded with demographic information.

The Reflotron portable dry chemistry analyzer was used in conducting finger-stick cholesterol assessments. Participants were provided with immediate feedback on their total cholesterol level and other heart disease risk factors following recommendations of the National Cholesterol Education Program.[23] Quality control procedures for cholesterol assessments included daily internal proficiency monitoring using serum controls (the coefficient of variation ranged from 2.9% to 4.2% across two serum levels for each of three machines), participation in an external proficiency testing program, and duplicate analysis of 10% of finger-stick samples using venous blood samples. Venous samples were analyzed by Pacific Biometrics Inc through enzymatic cholesterol assay procedures standardized to reference values determined by the Centers for Disease Control and Prevention. The average percent bias of the Reflotron results relative to the venous samples were −0.3%, −3.3%, and −3.2% for our three machines. Finger-stick and venous values correlated .95, and there was no evidence of systematic operator differences.

The Block diet history questionnaire[21] was administered at baseline in a self-administered, small-group format following detailed instructions. Staff reviewed forms for completeness and implausible answers and resolved problems with respondents. Later, forms were reviewed with the DietEdit feature of the computer scoring system. Mean grams of fat per day were calculated as the primary dietary dependent variable. The full diet questionnaire used in 1991 proved to take too long to complete; thus, in 1993 we used the abbreviated Block fat screening measure.

TABLE 2—Intervention Activities: Take Heart Menu

Activity Class	Tobacco	Food Choices
Motivational/incentive (provide encouragement)	Give away bumper stickers, buttons, key chains Carbon monoxide feedback Stop smoking contests and competitions Reimbursement programs Other	Give away bumper stickers, buttons, key chains Cholesterol feedback and food choice advice Recipe and weight loss contests Reimbursement programs Other
Educational/skills training (develop new skills)	Self-help written materials, quit kits Short stop smoking presentations Video presentation with discussion groups "Freedom from Smoking" program Other	Self-help written materials, calorie and fat guides Presentation with food samples Video presentation with discussion groups Cooking demonstrations, recipes Cafeteria, lunch room displays, table tents Other
Policy/environmental (change the work site)	Review/strengthen smoking policy Review/change sale of tobacco on site Display "Please No Smoking" signs Other	Review/change cafeteria food choices and labeling Review/change vending machine food choices Display nutrition posters Distribute shopping lists and refrigerator materials Other
Maintenance (use community resources)	Work with local health agencies Participate in community events Newsletter articles Other	Work with local health agencies Participate in community events Newsletter articles Other

Intervention

The intervention model for the Take Heart program uses the stage of change model[7,24] as a framework for assisting work sites and employees through various behavior change stages. For employees in precontemplation or contemplation stages, our objectives were to stimulate consideration of the risks of high cholesterol and smoking and ways to reduce these risks by making changes in nutrition and tobacco use behaviors. For employees in later stages, we attempted to provide assistance in altering dietary and/or tobacco use behaviors, as appropriate, and in maintaining these healthy behaviors.

The intervention was designed to maximize the fit between program content and delivery and work-site norms. An employee who knew the work site well (often a human resources coordinator) acted as our contact person and solicited a cross section of employees to participate in a steering committee (see Reference 19 for more detail). The steering committee was then oriented and assisted by an Oregon Research Institute staff facilitator and by written guidelines in promoting, planning, and implementing intervention activities.[19]

Early intervention work sites were invited to send at least two representatives to a Take Heart orientation breakfast at which the program was described.

TABLE 3—Tobacco Outcomes for Cohort and Cross-Sectional Samples, by Intervention Condition

Dependent Variable	Early Intervention, Mean (SD)	Delayed Intervention, Mean (SD)	P
Cohort data[a]			
Smoking prevalence			
1991	.19 (.13)	.19 (.09)	
1993	.16 (.13)	.16 (.07)	
Change	.03 (.04)	.03 (.05)	NS
Smoking cessation[b]	.25 (.27)	.27 (.20)	NS
Cross-sectional data[c]			
Smoking prevalence			
1991	.22 (.11)	.23 (.09)	
1993	.18 (.08)	.18 (.07)	
Change	.04 (.06)	.05 (.07)	NS
Smoking cessation	.30 (.15)	.31 (.13)	NS

[a]The average work-site sample size was 49.
[b]Among baseline smokers.
[c]The average work-site sample size in 1993 was 106.

TABLE 4—Dietary Outcomes for Cohort and Cross-Sectional Samples, by Intervention Condition

Dependent Variable	Early Intervention, Mean (SD)	Delayed Intervention, Mean (SD)	P
Cohort data[a]			
Fat intake, g			
1991	33.18 (8.25)	37.14 (10.18)	
1993	30.21 (7.55)	32.60 (8.02)	
Change	2.97 (3.36)	4.54 (3.36)	NS
Calories from fat, %, 1991	37.30 (1.90)	37.94 (2.22)	NS
Cross-sectional data[b]			
Fat intake, g			
1991	35.21 (8.54)	37.36 (9.78)	
1993	33.25 (8.05)	34.71 (8.31)	
Change	1.96 (3.60)	2.64 (3.92)	NS
Calories from fat, %, 1991	37.95 (1.86)	38.04 (1.83)	NS

[a]The average work-site sample size was 49.
[b]The average work-site sample size was 110.

The occasion provided an opportunity for work-site representatives to meet each other and Take Heart staff and to carry back to their organizations enthusiasm and commitment for the program. A "kickoff" event was planned by each work site to familiarize employees with the program (e.g., Great American Smokeout, "smart snacking" taste tests). Employee steering committees met monthly and selected and publicized activities and events, involved coworkers, and lobbied for changes in work-site health promotion policies.

Intervention activities were developed by means of a 4 × 2 matrix (see Table 2) that listed examples under each of four activity classes (motivational/incentive, educational/skills training, policy/environmental, and maintenance) for both tobacco and nutrition. This "Take Heart menu"[19] is part of a 72-page guidebook provided to steering committee members to help plan work-site activities. Each work site was encouraged to conduct at least two activities from each of the eight cells of the matrix during the 2-year intervention period. This provided standardization of intervention content but also allowed sites to tailor the intervention to their situation.

Motivational and incentive activities were designed to provide encouragement and/or increase awareness; these activities included, for example, carbon monoxide feedback for smokers and weight loss contests. We also distributed a variety of materials with the Take Heart logo (e.g., hats, insulated lunch bags, key chains) to facilitate attendance and enhance the visibility of the project. Educational and skills training activities involved distribution of self-help behavior change materials, presentation and discussion of videos (e.g., on lowering cholesterol, environmental tobacco smoke), and several taste testing and food label reading demonstrations and discussions. Activities required no more than 15 to 20 minutes and were offered at times (e.g., lunch hours, break times) and work-site locations (e.g., outside the cafeteria, in the employee lounge) selected to facilitate participation. Work-site-wide activities targeting environmental change included reviewing existing policies related to tobacco use at the work site and inclusion of low-fat items in vending machines and cafeterias. Activities were coordinated, whenever possible, with community or national events (e.g., Great American Smokeout, National Nutrition Month) to facilitate maintenance. Linkage with community events helped in increasing liaisons between work sites and local voluntary health organizations and in building a supportive climate for maintaining changes.

Statistical Analyses

All analyses were conducted on SPSS[x]; the work site was the unit of analysis. After initial descriptive statistics (means, standard deviations, distributional statistics) had been calculated, paired *t* tests were used to conduct primary analyses. This process reflected the experimental design, which involved pairing and then randomizing work sites to conditions (as described earlier).

Results

Primary Analyses

As can be seen in Tables 3 through 5, work sites were well matched on baseline levels of our dependent variables. There were no significant between-conditions differences on baseline smoking prevalence (overall mean = 22% to 23%),

dietary fat intake (overall mean = 38% of calories from fat), or cholesterol levels (overall mean = 192 mg/dl; 41% of employees had cholesterol levels of 200 mg/dl or higher).

Results for all participants present at a given assessment are presented in the lower sections of Tables 3 through 5 (average n across the four dependent variables = 109 per work site at follow-up). An average of 49 employees per work site participated in both assessments and formed the cohort data set. Results for the cohort are presented in the upper portions of Tables 3 through 5. It is beyond the scope of this paper to present detailed comparisons of the cohort and cross-sectional samples. These issues will be presented elsewhere (S. M. Boles, R. E. Glasgow, L. A. Strycker, J. F. Hollis, and J. P. Mullooly, unpublished data, 1994). As shown later, the results were quite similar across cohort and cross-sectional samples, and in no case was the interpretation of an effect (or absence of effect) different for cross-sectional vs cohort data.

We considered several variables for potential use as covariates, including gender, age, education, and occupational level. However, in no cases were there baseline differences between conditions on these variables, and these factors were seldom related to outcome. Therefore, the results presented here were not adjusted for demographic variables.

Primary Outcome Analyses

Paired *t* tests, with work site as the unit of analysis, were used to compare 1991 to 1993 differences between early and delayed intervention work sites. As illustrated in Tables 3 through 5, there were no between-conditions differences on any of our primary dependent variables (smoking cessation, dietary fat intake, or cholesterol levels) for either cohort or cross-sectional samples. Different amounts of change, however, were observed on smoking and dietary outcomes.

A high rate of smoking cessation was observed for both conditions among both cohort (26% quitting over 2 years) and cross-sectional (30% cessation) samples, which was surprising given the relatively low baseline smoking prevalence of 23% in these companies. This prevalence was, however, very similar to those of other work-site,[25] health maintenance organization,[26] and community samples from Oregon[27] collected at approximately the same time.

Substantially less change was observed in dietary patterns and especially in cholesterol levels. As shown in Tables 4 and 5, there were no meaningful improvements in either dietary patterns or cholesterol levels over time in either condition. This was true both for all employees assessed and for the subset initially having cholesterol levels greater than 200 mg/dl.

Finally, a summary risk factor score from the Framingham project,[28] which involves the use of information on smoking, cholesterol, and blood pressure levels to calculate 10-year risk of developing heart disease, was calculated. (Since we did not collect blood pressure measurements, age-, sex-, and race-specific averages for these values were entered into the logistic formula.) There were no between-conditions differences on this score and little overall change.

TABLE 5—Cholesterol Outcomes for Cohort and Cross-Sectional Samples, by Intervention Condition

Dependent Variable	Early Intervention, Mean (SD)	Delayed Intervention, Mean (SD)	*P*
Cohort data[a]			
Cholesterol, mg/dl			
All subjects (n = 49)			
1991	191.39 (7.69)	190.86 (6.27)	
1993	192.21 (7.89)	191.25 (9.05)	
Change	−0.81 (7.81)	−0.39 (6.80)	NS
Subjects >200 mg/dl at baseline (n = 19)			
1991	233.56 (10.04)	232.80 (9.53)	
1993	226.17 (10.91)	226.02 (12.05)	
Change	7.39 (10.70)	6.78 (7.28)	NS
Cross-sectional data[b]			
Cholesterol, mg/dl			
1991	193.76 (6.96)	190.40 (7.25)	
1993	191.03 (8.89)	187.54 (8.60)	
Change	2.70 (8.06)	2.90 (7.64)	NS
Cholesterol >200 mg/dl, %			
1991	41.70 (5.88)	39.06 (9.10)	
1993	38.95 (9.01)	34.83 (8.58)	
Change	2.70 (8.17)	4.20 (7.96)	NS

[a]The average work-site sample size was 49.
[b]The average work-site sample size was 110.

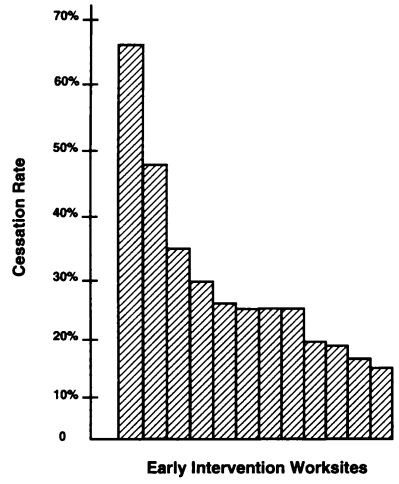

FIGURE 1—Smoking cessation rates among Take Heart early intervention work sites.

Variability across Work Sites

Although our data points for the above work-site-level analyses were based on a reasonably large number of employees per site, there was considerable variability across sites in both the early and delayed intervention conditions. Tables 3 through 5 present information on the standard deviations of these work-site-level means. This variability is illustrated in Figure 1 for early intervention work sites on one dependent variable: smoking cessation. As can be seen, some work sites produced high cessation rates, several produced moderate but still impressive rates, and others produced substantially lower rates.

TABLE 6—Change in Process Variables for Cohort and Cross-Sectional Samples, by Intervention Condition

Process Variable	Early Intervention, Mean (SD)	Delayed Intervention, Mean (SD)	P
Cohort data			
Smoking quit attempts, %	66 (21)	76 (19)	NS
Smoking stage of change, % progressing	48 (55)	49 (41)	NS
Attempts to reduce fat (scale of 0–4)	−.13 (.32)	−.20 (.14)	NS
Eating stage of change, % progressing	15 (10)	12 (05)	NS
Support for health behaviors (10-pt scale)			
Supervisor	.52 (.51)	−.05 (.40)	<.01
Coworker	.30 (.43)	.04 (.33)	NS
Total	.41 (.45)	.005 (.33)	<.03
Cross-sectional data			
Smoking quit attempts, %	53 (15)	50 (09)	NS
Support for health behaviors (10-pt. scale)			
Supervisor	.47 (.67)	.01 (.35)	<.06
Coworker	.24 (.57)	.04 (.33)	NS
Total	.35 (.60)	.03 (.31)	NS

It is beyond the scope of this paper to report on work-site and employee correlates of outcome, but such analyses are in preparation elsewhere (J. R. Terborg and R. E. Glasgow, unpublished data, 1994).

Process Measures

We were also interested in the extent to which intervention altered potential process variables of behavior change attempts and stage of change. As shown in Table 6, with one exception, there were no between-conditions differences on these change measures for either cross-sectional or cohort comparisons. The one process variable in which there was greater improvement in early intervention than delayed intervention work sites was perceived support for health promoting behaviors ($P < .03$ and $P < .14$ for cohort and cross-sectional results, respectively), especially perceived support from supervisors ($P < .01$ and $P < .06$ for cohort and cross-sectional analyses, respectively).

Discussion

Because the study had a number of methodological strengths, the overall negative results from the first round of the Take Heart project were disappointing. The experimental design involved randomizing a reasonable number of relatively diverse work sites and used work site as the unit of analysis.[8,29] The study had adequate power (e.g., a power of .90 to detect a difference of 10 mg/dl in cholesterol [$\alpha = .05$, two-tailed, paired t test]), even with work site as the unit of analysis and with the loss of the one work-site pair. As reported elsewhere (R. E. Glasgow and J. R. Terborg, unpublished data, 1994), the employee steering committees implemented the intervention menu approach as recommended, and there were substantially more improvements in the number and types of health promotion activities offered in early versus delayed intervention work sites. We also collected and reported multiple measures of outcome and both cross-sectional and cohort-based results, all of which produced consistent conclusions.

Unfortunately, the inescapable conclusion is that the intervention used in this initial round of the Take Heart project did not improve employee health behaviors related to nutrition and tobacco use more than did repeated assessments alone. As is usually the case with "negative results,"[30] there are several potential explanations for the lack of effects. Below we discuss six possibilities.

1. The activities may not have been the appropriate kinds of work-site actions to produce changes in employee behaviors. We cannot rule out this explanation, but we did demonstrate consistent increases across several different activity categories (motivational/incentive activities, skills training, community liaison and maintenance activities, and work-site policy/environmental change actions) recommended by health promotion experts.[31–33] It may be that more aggressive attention to policy factors such as workplace smoking bans, taxes,[16] risk-rated insurance, and "heart healthy" cafeterias is needed to create an appropriate context for behavior change.[14,34]

2. Dietary and smoking behaviors are difficult to change, and more intensive or longer term interventions involving repeated, ongoing contacts with employees may be necessary. Unfortunately, only a small percentage of motivated employees will participate in intensive (and expensive) behavior change programs that require considerable commitment.[8,35,36] Furthermore, employees who participate are often those who are most healthy and least need such support,[37] bringing into question the public health relevance of these intensive programs.[8,37] Finally, intensive programs are less likely to be either disseminable or cost-effective.

3. Although steering committees selected and helped implement a variety of activities, this process may not have created a sufficient level of ownership and employee involvement to generate changes in work-site norms or significant behavior change. Support for this interpretation comes from the fact that we did not witness between-conditions differences in reported attempts to stop smoking or reduce fat intake. We did, however, see greater improvements in perceived support in early versus delayed work sites. Unfortunately, we did not collect direct measures of participation; thus, it is unknown precisely how many employees actually took part in company activities. We have made changes in the next round of the Take Heart project to address this issue.

4. Secular trends toward improvement in health behaviors may have been sufficiently strong to override a modest intervention effect. Or, relatedly, the employee assessments may have been sufficiently reactive to produce behavior changes in both conditions. This could potentially explain why smoking decreased in both treatment and control work sites. Reactivity, however, would not explain the absence of dietary or cholesterol change in either condition.

5. The most pessimistic conclusion would be that even well-designed, multifaceted work-site health promotion pro-

grams do not produce meaningful improvements in employee behavior. A recent review concluded that, at least for work-site smoking cessation studies, more tightly controlled, methodologically sophisticated outcome studies produce smaller effect sizes.[38] It is too early to draw this conclusion for other target behaviors, but work-site health promotion studies reporting the most positive results have generally involved a small number of unrepresentative work sites, have used self-selected volunteer employees rather than work sites as the unit of analysis, and/or have not used strong experimental designs.[11,12,15,39,40]

This investigation also has limitations. Foremost among these is that only 48% of employees participated in the assessments. This occurred even though employees were provided time off work and we promoted participation through multiple channels, obtained strong top management support, ensured employees of confidentiality, minimized on-site assessment time, and provided immediate feedback on cholesterol levels. Our participation rates, while lower than those of some work-site survey studies, are comparable to or exceed those of other reports that have involved nonmandatory cholesterol assessments at the workplace.[41–43] While lower participation limits the generalizability and potentially the validity of our findings, it would be more problematic if we were claiming positive results. It should be noted that our participation rates were very conservatively calculated and included part-time and temporary employees (some of whom may not have been at the work site when assessments were conducted) as eligible. (We also conducted supplemental analyses that revealed that survey participation rates were not related to level of companywide behavior change. Correlations between survey participation rate and work-site-level change on dependent variables were all nonsignificant and ranged from .04 to .20.) The low participation rates may have been due in part to a statewide economic recession that affected most work sites.

6. We believe that the most important reason for the lack of an intervention effect was the considerable variability across work sites within conditions. Despite our efforts to tailor programs to individual work sites via the menu approach and to create employee steering committees as recommended by several authors,[17,18,44,45] several early intervention sites did poorly. Figure 1 illustrates the magnitude of this variability for smoking cessation, but similar effects were observed on all variables. Review of other reports on health promotion suggests that this is not an isolated finding.[3,9,46] Similar results have also been observed in studies of organization change and development. Future research is recommended to identify both work-site and employee characteristics predictive of successful outcomes.[44]

We learned several practical lessons from implementing the first round of the Take Heart project and are incorporating these observations into our current intervention in the delayed intervention work sites. We remain committed to the goals of employee involvement and partnership and to the employee steering committee.[17–19,45] However, in our efforts to allow maximum choice and tailoring within the confines of our menu approach, we may not have been sufficiently structured early in the program. Some steering committees grasped the menu concept and progressed rapidly, but others were substantially delayed in implementing their first Take Heart events. Greater direction from the research center early in the program might have helped.

Steering committee composition may be critical as well. We provided guidelines for composition and ensured that each committee had representation from diverse employee groups, including management and labor, men and women, smokers and nonsmokers, and employees from all major departments. Nevertheless, there were large differences across work sites in steering committees' level of activity. In the second round of Take Heart, we are emphasizing that steering committee members should be willing to get involved, promote the program among coworkers, and participate in events rather than just attend meetings.

We did not encourage interaction among early intervention work sites because of concerns about independence of effects. In retrospect, this may have been a mistake because many sites later expressed interest in what others were doing. In our current intervention, we are encouraging and facilitating more interaction between sites, including joint meetings and publication of a Take Heart newsletter so that information can be shared.

Finally, we may have been too conservative regarding the level of intervention required to overcome larger social contextual factors.[14] During 1990 to 1993, many companies in Oregon experienced major financial hardships. Attention to company survival and to whether or not one would have a job understandably may have taken precedence over the Take Heart project. Employee participation in health promotion activities tends to decrease during times of downsizing and budget cuts (M. Morton, written communication, September 1993). Future work-site interventions may want to either screen sites for potential downsizing or layoffs or develop activities specifically targeted at employees/sites coping with viability and organizational change issues. The second round of the Take Heart project will address these issues. □

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